California ISO

Revised Straw Proposal on Reforms to Energy Market and PIRP Rules and Procedures

Renewable Integration: Market and Product Review
Phase 1

February 17, 2011
Revised Straw Proposal
Reforms to the PIRP and Energy Market Rules and Procedures

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1 Introduction and Overview

A core theme of this initiative is that both the conventional generation fleet and the expanding renewable fleet, particularly the variable energy resources, need to become more dispatchable to address new operational requirements resulting from additional supply uncertainty and variability. This straw proposal sets forth reforms to the energy market rules – notably lowering the energy bid floor, eliminating elements of the Participating Intermittent Resources Program (PIRP) and making changes to the netting protocol for the purpose of calculating Bid Cost Recovery – which are targeted at eliciting the economic bidding and operational flexibility needed for the ISO’s broader initiative to prepare the wholesale markets and system operations for renewable integration. The ISO has adopted a staged approach to this initiative. Phase 1 elements focus on near-term changes (i.e., 1-2 years to implementation) anticipated to provide benefits in any future renewable resource scenario (as well as other potential market benefits). The broader initiative aims to ensure the longer-term alignment between market incentives and operations by evaluating the need for potential new market products or rule changes.

Previous papers issued as part of this stakeholder process have included rich background and context for the initiative to integrate renewables onto California’s transmission grid and into its wholesale electricity market. While this Revised Straw Proposal draws considerably on that material and benefits from the discussions thereby spurred, this document focuses in on the specific proposals offered as the outcome of the Phase 1 RI-MPR stakeholder initiative.

The specific proposals included herein are:

- **Settlement of variable energy resources (VER) in the same manner as conventional supply resources.** VER will pay and be paid actual LMPs for their scheduled output and uninstructed imbalance energy for deviations from their day-ahead schedule rather than an averaged financial settlement as under the current PIRP rules. In addition, unlike the policies of PJM and NYISO, decremental energy bids will not be required from VER, which is again consistent with the ISO’s market rules for conventional resources.

- **A reduction in the energy bid floor.** The floor will be lowered from the current soft bid floor of -$30/MWh to a hard bid floor of -$300/MWh. The objective of this rule change is to foster additional dispatch flexibility over time from both thermal and renewable resources. In particular, the bid floor is intended to account for the opportunity cost of curtailment faced by wind and solar resources and the Scheduling Coordinators that bid them into the market.

- **A change to Bid Cost Recovery netting methodology.** This policy change is aimed at protecting generating resources profits in one market being diminished by netting against costs in another; this is a case of particular concern as we lower the energy bid floor. The ISO recognizes that, without this change, the incentives to economically bid flexible resources into the market in real time are eroded which is counter to the overarching goal of this suite of policy changes.

Several issues that were outlined in the original Issue Paper for this stakeholder initiative are being addressed separately and are therefore not included in this Revised Straw Proposal. Those issues are:
- **Final rules for Regulation Energy Management (REM):** the ISO’s proposal with respect to REM was approved by the ISO Board of Governors on February 3, 2011.\(^1\)
- **Changes to rules for dissemination of wind and solar forecast data:** these are being addressed through Data Release Phase 3, with an Issue Paper\(^2\) posted on 12/10/10. A stakeholder call to discuss the proposal was held on 12/17/10. The Straw Proposal was issued on February 1, 2011 and was discussed in a stakeholder conference call on February 8, 2011.\(^3\)
- **Non-Generic RA Capacity:** the ISO proposed modifications to the CPUC RA program that would include generation attributes as part of the LSE RA procurement decisions. In a revised scoping memo issued by the ALJ, he indicated that this issue would not be considered in the CPUC’s expected June 2011 decision but that it would be included in the scope of Phase 2 and addressed in a later decision.

The publication of a revised straw proposal rather than a draft final proposal at this stage reflects the fact that there are significant revisions to the PIRP grandfathering, the new energy bid floor level and the proposed revision of the current bid cost recovery netting methodology. The ISO looks for stakeholder comments on these changes prior to publishing the draft final proposal. In addition, we anticipate providing additional information regarding the bid cost recovery netting methodology. Further internal analysis is underway to assess the impact of these proposed changes on current rules and systems.

The issues outlined in this paper will be discussed at a stakeholder meeting on February 24, 2011.

## 2 Stakeholder Process

The ISO appreciates the detailed comments provided by many stakeholders on the Issues Paper and related comments on the 20% RPS study.\(^4\) At the stakeholder meeting on October 5\(^{th}\), the ISO discussed the topics described in the Issues paper with market participants. On November 19 the same issues were reviewed and discussed again with the Market Surveillance Committee in order to seek additional input to inform the development of the Straw Proposal\(^5\). The straw proposal was published on December 22, 2010 and stakeholder comments were provided on January 20, 2011. A brief summary of these comments is provided in each section below, and a stakeholder comments matrix, upon which we invite input, is included as an attachment to this Revised Straw Proposal.

\(^1\) The final policy paper for the REM initiative is available at the following link: [http://www.caiso.com/2b05/2b05e7075f6d0.pdf](http://www.caiso.com/2b05/2b05e7075f6d0.pdf)
\(^2\) The Issue Paper for Data Release and Accessibility Phase 3 is posted at: [http://www.caiso.com/2867/2867c4b665cc0.pdf](http://www.caiso.com/2867/2867c4b665cc0.pdf)
\(^3\) Document pertaining to the Data Release and Accessibility stakeholder initiative are available at the following link: [http://www.caiso.com/286c/286c89152e750.html](http://www.caiso.com/286c/286c89152e750.html)
\(^4\) Comments are available at the following link: [http://www.caiso.com/27e3/27e3c4fbfd0.html#2834ba811780](http://www.caiso.com/27e3/27e3c4fbfd0.html#2834ba811780)
\(^5\) Materials discussed at the MSC meeting are available at the following link: [http://www.caiso.com/2811/28117c3575190.html](http://www.caiso.com/2811/28117c3575190.html)
Components and Schedule Objectives of Phase 1 Proposal

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3 Phase I Revised Straw Proposal

In order to efficiently and reliably integrate renewable resources over the coming decade, the ISO anticipates most of the needed operational flexibility being supplied by dispatchable thermal and hydro generation, including pumped storage, with an increasing contribution over time from newer types of non-generation resources, such as advanced storage and demand response. In the near term, the existing operational flexibility inherent in the current fleet and the spot market should be maximized through design refinements to the extent necessary and practicable.

A significant impediment to the ISO’s ability to fully utilize the flexibility of the current fleet is the extent to which supply resources participate in the market as self-scheduled energy without
offering decremental real-time bids. If more resources submit economic bids rather than self-schedule, the market optimization can dispatch those resources according to system and local needs rather than by cutting self-schedules or relying on out-of-market actions such as exceptional dispatch. For this reason, this Phase 1 proposal focuses on three changes to existing market rules that, implemented together, will provide improved incentives for renewable resources and conventional generation alike to submit economic bids and thereby give the market optimization the flexibility it needs to determine an economically efficient dispatch.

3.1 Proposed Revisions to the PIRP rules

The PIRP was designed and implemented well before there was a clear expectation of the enormous growth of variable renewable resources that will occur under higher RPS and without the benefit of what we have learned from the studies of the operational impacts of renewable integration. As such, the PIRP rules create disincentives for economic dispatch of these resources through the real-time market. Specifically, in the early 2000s, the financial risk of being exposed to the wholesale market costs of energy imbalances was seen as a significant impediment to wind resource development. In July 2001, with support from the utilities and state agencies, the ISO instituted a stakeholder process to develop PIRP that resulted in a consensus proposal and Board approval in September 2001. The rules for the PIRP were approved by FERC in 2002 and implemented in June 2004. With the advent of the redesigned market in April 2009, the PIRP rules were changed again to be compatible with the new ISO market structure, both to remove some charge types and to reflect settlements at locational marginal prices.

Under the current PIRP rules, the participants receive several benefits. Program participants are exempt from or receive special treatment for several of the market charges. Deviations are netted over the month for market settlement. In exchange for these benefits, the Program participants are required to sign ISO agreements, install ISO meters, provide telemetry of data, report outages, pay a forecast fee of 10 cents per MWh, and self-schedule in the RTM consistent with the ISO’s forecast of wind generation. Importantly, to obtain the PIRP financial settlement, PIRP resources are not allowed to submit bids into the ISO markets. If they do submit bids, then they settle at the LMP for the intervals in which the bids are submitted without any netting of deviations.

As discussed in the 20% RPS Study, operational conditions that could require curtailment of renewable energy are expected to increase in frequency and magnitude, particularly over-generation in Spring high hydro, light load conditions, but over time also during some daily ramp intervals, depending on how other resources on the system are bid and scheduled. While the ISO could continue to send dispatch instructions to variable energy resources on a non-economic reliability basis, price-based (economic) dispatch of such resources is necessary for efficient management of system constraints and benefits renewable energy production.

Under economic dispatch, the operator of a variable energy resource can generally know that only the MW specified by the RTM dispatch, including real-time forecasts of renewable production, are required to be curtailed and that the RTM will determine an efficient bid-based price for settling such curtailment. This is consistent with the over-arching goal for renewables which is to minimize reliance on administrative measures to successfully participate in ISO

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6 For further detail, please see the ISO Department of Market Monitoring white paper on this topic, available at the following link under the heading of “2001 Special Reports and Presentations”: http://www.caiso.com/docs/2005/10/04/2005100412253314368.html
markets and to provide incentives to supply economic bids. In this way, the market itself can relieve challenging system conditions while optimizing production by intermittent resources.

3.1.1 Stakeholder comments

In written comments on the Straw Proposal, most stakeholders expressed support for modifications to the PIRP. Specifically, out of the seventeen sets of comments received, only three opposed the proposal to phase out PIRP; those were submitted by CalWEA/LSA/VSI, CEERT, and LS Power. In their comments, CalWEA/LSA/VSI stated that they “strongly oppose the elimination, and lack of expansion to DA or Dynamic Transfer schedules” and that they support instead “reasonable changes to allow economic bids and further assessment of changes in light of ISO needs and other regulatory/market developments.” CEERT encouraged the ISO to try to incent other resources to submit economic bids as well, rather than targeting VERs. LS Power encouraged the ISO to develop a replacement program for PIRP that would similarly reduce imbalance risks faced by VERs. Although the ISO appreciates the concerns of these parties, we have determined that the overall efficiency of the market and the successful integration of renewable resources will ultimately depend on providing renewables with incentives to improve dispatchability and to economically bid into the market. All the other comments received on this topic were in favor of ending the PIRP program. Some stakeholders also requested clarification on the grandfathering provisions, which is provided in section 3.1.7 below.

3.1.2 Rules for deviations from real-time dispatch instructions

Currently, deviations between each PIRP resource’s self-scheduled forecast value and its actual real-time output are netted across the entire month. The ISO now proposes that there be no netting for VER that are not currently participating in PIRP. Rather, these VERs will be settled at actual LMPs for their scheduled output and uninstructed imbalance energy for uninstructed deviations from their day-ahead schedules, rather than an averaged financial settlement as under the current PIRP rules. In addition, VER will be permitted to submit real-time economic energy bids which the market optimization will use to issue them dispatch instructions. Real-time deviations from schedules that are consistent with real-time ISO dispatch instructions will be settled as instructed energy at each resource’s LMP. This is consistent with treatment of other supply resources in the market.

3.1.3 Settlement of imbalances

Adherence to the PIRP scheduling rules is required to include that hour’s production in the settlement which calculates deviations as the weighted average of LMPs multiplied by the net imbalance deviations over the month. The result to date is a small subsidy to the wind resources from the buyers in the real-time wholesale market (who pay for all real-time energy at its actual cost), and a correspondingly typically a small reduction in the financial risk of participation in the market for wind generators.

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7 The ISO’s proposal for VER currently in the PIRP is discussed in a later section of this paper.
With the exception of PIRP resources, uninstructed imbalance energy (UIE) charges are allocated to each market participant’s net negative deviations. The PIRP program design includes netting deviations over a whole month rather than day-by-day as is the case for other supply resources. The rationale for this different netting methodology has been that VER resources do not have control of their deviations.

The average value of the PIRP netting benefit is calculated by taking monthly data on Participating Intermittent Resource UIE charges allocated to the market and dividing those values by the monthly total MWh of forecasted production by participants in the PIRP. In other words, for each month this calculation takes the total UIE charges that PIRP resources don’t pay as a result of the netting, and divides that value by the forecasted production of those resources. The result is a per-MWh value that approximately captures the avoided UIE charges. In fact, the value is slightly over-stated because the UIE charges for PIRP resources are allocated to the entire market, and not to non-PIRP resources alone.

From January 2005 through March 2009, i.e., prior to the start of the LMP market, the average PIRP netting benefit was $3.46/MWh. Since MRTU go-live (April 2009 – August 2010), the average has been $1.32/MWh. This reduction in benefits that is reflected under the new market design is likely due both to the improved accuracy of the forecast of intermittent resources, and to lower market prices.

The ISO proposes to do away with the current practice of netting VERs’ imbalance energy over a month. This practice was based on the contention that these resources were different and could not control their output. However, the technology of VERs, particularly wind generation, has advanced such that they are now able to control their upward deviations from schedule and thus the original rationale for the PIRP settlement differential treatment is no longer applicable. Therefore, we are proposing that the deviations of intermittent resources be treated just as they are for conventional generation.

### 3.1.4 Uplift charges

Prior to the implementation of the LMP market, there were several costs, including minimum load cost compensation, that were charged to net negative deviators. Under the new market structure, only costs associated with payment to generation for exceptional dispatch are assessed to net negative deviators. All generating resources with net negative deviations are charged these costs. The methodology for determining the charges PIRP resources pay, however, is different from the methodology for non-PIRP resources. Although PIRP resources are still charged these costs, they are charged based on their net negative deviations over the entire month, whereas non-PIRP resources simply pay or are paid the price of imbalance energy in each 10-minute settlement interval. The rationale for this difference has been that VER do not have control of their deviations and should therefore not be exposed to the price risk associated with deviations.

The ISO proposes to settle VERs in the same manner as conventional supply resources. This is consistent with the proposal to eliminate the monthly netting of deviations for VERs. Furthermore, the ISO maintains that charging VERs a discounted share of the cost of exceptional dispatch is unwarranted differential treatment. Finally, the technology of VERs has advanced such that they in fact are able to control their upward deviations from schedule.
3.1.5 Scheduling and Bidding Obligations

Under the current PIRP rules, there is no DA scheduling requirement. In the HASP, PIRP resources must self-schedule their expected output based on the forecast prepared by the independent forecast vendor. While real-time economic bids are permissible, the resource submitting the economic bids in any hour forfeits the PIRP benefit of the settlement netting for the applicable hour.

The ISO proposes that day-ahead and real-time bidding by VER in general be left up to each resource, with no requirements that do not apply to other resource types. Unlike the policies of PJM and NYISO, we propose not to require decremental energy bids from VER resources just as they are not required for other supply resources. In short, the ISO proposes that there not be different bidding and/or scheduling obligations for VERs than there are for conventional generation.

To the extent that a VER provides RA capacity to meet an LSE’s RA requirement, the ISO intends to continue the policy of classifying VER as use-limited for RA purposes. Under tariff section 40.6.4.3.1 this would require the RA resource to offer into the DAM the amount of energy it expects to have available in each hour of the next day, but would leave the determination of how much energy is available the next day and the prices at which to offer that energy up to the resource owner, as it currently is for conventional use-limited RA. Such a requirement would thus bring VER into alignment with the requirements on other use-limited RA capacity.

3.1.6 Forecast for Variable Energy Resources

The ISO proposes to continue having the independent vendor prepare forecasts for variable energy resources. Resources in the PIRP currently self-schedule the hour-ahead forecast output through the hour-ahead scheduling process (HASP). The ISO proposes, however, that the forecast not constrain VERs as to how much they can bid or schedule in the ISO markets. As it is today, the ISO uses a day-ahead forecast to inform the residual unit commitment (RUC) process in the day-ahead market, and will continue to use hour-ahead and shorter-term forecasts as inputs to the real-time pre-dispatch (RTPD) and real-time 5-minute dispatch.

The cost of the forecast is currently borne by intermittent resources in PIRP as well as those not under the PIRP that request an individual, resource-specific forecast. Through the third phase of the data release and accessibility initiative, the ISO proposes to release an aggregated version of this forecast so that it is available to all market participants. The ISO proposes to spread the cost of the independent VER forecast to all market participants through the grid operations component of the grid management charge (GMC). The increased market efficiency gained by the availability of the VER forecast is a benefit to reliability and thus to all market participants, and so this allocation of charges is consistent with the principle of cost causation.

Resources that remain in the PIRP program under the optional grandfathering described below will continue to need a resource-specific forecast upon which to base their self-schedule in the HASP. Further, the ISO anticipates that non-PIRP VERs may also want a resource-specific forecast. Given that the aggregate forecast will already be paid for as noted above, the ISO proposes that those VERs that need or want a resource-specific forecast pay only the additional

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8 More information on the data release and accessibility initiative is available on the ISO website at the following link: [http://www.caiso.com/286c/286c89152e750.html](http://www.caiso.com/286c/286c89152e750.html)
cost associated with producing that forecast. This may or may not result in a reduction to the 10¢/MWh fee that is currently charged for this service. Exactly what that service is will depend on what aggregated forecast will be made available which is not yet determined. It will be determined through the Data Release Phase 3 initiative.

3.1.7 Optional grandfathering of existing PIRP resources

Upon further analysis and based on stakeholder feedback, the ISO’s recommended grandfathering provisions with respect to PIRP are revised to be more practical and feasible, and to be better in sync with the goals of this stakeholder policy initiative. The ISO rejected the prior proposal to grandfather any current PIRP resources as well as those under contract – even those resources not yet built – for two important reasons: First, the ISO and stakeholders alike identified that it is problematic from a practical standpoint to extend any program to resources not yet under a PGA; second and more fundamentally, this grandfathering policy would very likely have resulted in an increasing MW capacity of intermittent resources not providing economic bids, and not being provided incentives to increase their dispatchability. These same concerns apply in the case that the PIRP is in existence for a protracted period due to resources being grandfathering for the duration of their existing contracts. In short, the prior proposal with respect to PIRP grandfathering, while developed out of concern for the intermittent resources, was counter to the over-arching goal to integrate intermittent resources efficiently into the wholesale market. Therefore the ISO proposes that only resources under a PGA by the effective date of the tariff change to implement this policy may remain in PIRP.

Accordingly, the ISO proposes that resources under the PIRP program can opt to remain in that program as it exists today until **five years** from the effective date of the tariff language implementing this new policy. (For example, if the effective date of the Tariff language reflective of this policy is received on August 1, 2011 then the PIRP will be completely eliminated as of July 31, 2016.) The ISO proposes, as previously, that participants can opt out of PIRP at any time, but cannot opt back in after that point.

The ISO continues to propose that no additional intermittent resources be offered the opportunity to opt into the PIRP after the effective date of the tariff changes associated with this proposal. The ISO proposes one narrow exception to this element of the proposal: a resource grandfathered in PIRP that expands its MW capacity over the course of the five-year window may include the added capacity along with the original capacity.

3.1.8 Summary of proposed changes to PIRP

In summary, the ISO proposes to close the PIRP to incoming resources and to phase out the program for existing participants as their existing contracts expire, as described above. The ISO’s conclusion is that the proposal to end PIRP will improve the ability of California’s wholesale energy market to continue to operate efficiently as production by intermittent resources increases under the renewable portfolio standard. Resources currently in PIRP lose their netting benefit for hours in which they submit economic bids and therefore have a disincentive to do so rather than self-scheduling in HASP at their forecasted level of production. Removing the PIRP netting benefit – which at $1.32 per MWh is dramatically less valuable than it was prior to the launch of the LMP market – will take away the current disincentive to economically bid. It is true that, on the one hand, there is a benefit that will no longer be available for VERs. On the other hand, there will be a greater level of flexibility enjoyed by
those resources as they are able to manage their own risk through economic bids in the day-ahead and real-time markets as do conventional supply resources.

### 3.2 Changes to the Energy Bid Floor

#### 3.2.1 Background for the current proposal

The ISO spot markets currently require that the economic bids submitted by scheduling coordinators to buy and sell energy have prices no greater than the cap of $750 per MWh and no less than the floor of -$30 per MWh. Negative bids serve an important function in the spot markets; among other things they are used by supply resources to elicit payments to decrement their energy production from previously scheduled levels, and by demand (including exporters) to increase their energy purchases from the market at times when there is excess supply. As discussed earlier, there is currently a limited supply of decremental energy bids to enable the ISO market systems to economically reduce energy supply to balance demand when needed, especially in off-peak hours that may be susceptible to much higher levels of over-generation as additional renewable production comes on-line.

The key is to have the right signals to incent resources to bid decrementally. Unfortunately, many resources are constrained based on contractual and environmental factors and do not have the flexibility to adjust their output during over generation situations. The bid floor needs to be set at a level to incent resources that can bid decrementally. The current bid floor level, -$30/MWh is not a sufficient incentive for VERs who receive additional revenues to produce energy outside of the market. The current bid floor level at -$30/MWh does not allow SCs to bid economically in many cases. Market design changes to increase the provision of decremental bids are an important element of the present initiative, to improve the ISO’s capability to use market-based optimization to manage over-generation conditions, real-time congestion and possibly system ramps in the future. If there is not a sufficient supply of decremental bids in any of these conditions, the ISO must issue non-economic instructions (i.e., instructions that are not based on energy bids) for resources to reduce their output. For a number of reasons these non-economic dispatch instructions result in less efficient curtailment of resources. Such instructions are determined by the market optimization through the use of market parameters that are outside the allowable range of economic bids and hence may result in decremental dispatch of plants with higher willingness to pay to remain in operation. Currently, the ISO has enough instances of insufficient decremental bids that a reduction in the bid floor is needed even in the near term; the future likelihood of increasing frequency and magnitude of over-generation in the next 2-3 years, particularly in high hydro conditions, makes such changes an even higher priority.

Most other ISO’s bid floors are set well below the ISO’s -$30/MWh level and this led the team to begin developing a proposal starting at the lowest end of the continuum (eliminating the bid floor) and working toward the lowest bid floor that could be justified. There was a strong market

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9 This section is written from the perspective of supply resources to simplify the discussion. It should be understood, however, that the energy bid floor is also relevant to demand resources, including both internal load and exporters that may be willing to increase their purchases of energy to relieve over-generation if the price were low enough.

10 For example, New York ISO has noted that negative LMPs in the absence of sufficient decremental bids has caused wind plants to curtail at higher quantities than would have been necessary if the decremental dispatch was conducted through the economic dispatch function of the ISO.

11 An indication of the frequency of decremental bid insufficiency is found in Table 4-1 in the 20% RPS Study, [http://www.caiso.com/23bb/23bb0cd0f6d0.html](http://www.caiso.com/23bb/23bb0cd0f6d0.html) which shows the number of 5-minute intervals with negative prices by season and hour of day from April 1, 2009 to June 30, 2010.
efficiency argument for the concept of setting the bid floor to -$1,000/MWh, symmetric with the bid cap. This approach had advantages from the perspective that it would reduce inconsistencies between parameter values used in the scheduling and pricing run. In the straw proposal the ISO also proposed to lower the energy bid floor in steps, in the same manner that FERC ordered the ISO to raise the bid cap - incrementally increasing the cap over time. Thus the ISO proposed to lower the bid floor to -$500/MWh initially in 2012 (in line with the current release plan for Phase 1), followed by a step down to -$750/MWh in 2013 and finally to -$1,000/MWh in 2014.

After further evaluation and based on evidence provided by stakeholders the ISO is now proposing to set the bid floor to -$300/MWh. The next section describes the rationale for choosing this level.

### 3.2.2 Rationale for Bid Floor Adjustment

The original reasoning behind setting the energy bid floor at -$30/MWh, as articulated in prior filings and FERC orders, did not consider the effects of renewable energy credits or production tax credits on a resource’s opportunity cost and hence its likely unwillingness to reduce its output for a payment of $30/MWh. For more background regarding the history for setting the bid floor at -$30/MWh, refer to the Issue Paper which provides a detailed breakdown.

The current energy bid floor is too high to elicit economic decremental bids from variable energy resources. This means that these resources would likely be unwilling to reduce their output for a payment of $30 per MWh, but may be willing to do so if they could earn a larger payment (i.e., by submitting a more negative energy bid). There a number of data points that the ISO used in developing the proposed energy bid floor of -$300/MWh:

- Renewable energy credits (RECs) are capped at $50/MWh.
- Tax credits for wind production along with other tax incentives guarantee these resources payments of close to $37/MWh. The renewable energy production tax credit (PTC) alone, currently at $21/MWh, is the primary federal incentive for wind energy and has been essential to the industry’s growth.
- The FERC Electric Quarterly Reports (EQR) filed by sellers in the ISO area for the 4th quarter of last year reported prices greater than $150/MWh for energy sales during that period.
- Additionally, the CPUC confirmed that a recent RFO issued for solar photovoltaic facilities had a cap of $295/MWh.
- Contract penalties associated with curtailing energy production places additional pressure on VERs to produce rather than decrement their energy.

12 Although the energy bid cap is currently $750 per MWh, FERC has ordered that it be increased to $1000 per MWh starting April 1, 2011.  
14 The renewable energy production tax credit is an income tax credit of 2.1 cents/kilowatt-hour and is allowed for the production of electricity from utility-scale wind turbines. This incentive was created under the Energy Policy Act of 1992. Through the American Recovery and Reinvestment Act (ARRA), Congress acted to provide a three-year extension of the PTC through December 31, 2012.
15 Alternatively, wind project developers can choose to receive a 30 percent investment tax credit (ITC) in place of the PTC for facilities placed in service in 2009 and 2010, and also for facilities placed in service before 2013 if construction begins before the end of 2010.
16 The FERC EQR reports are located at: [http://www.ferc.gov/docs-filing/eqr.asp](http://www.ferc.gov/docs-filing/eqr.asp)
Given these statistics, at the -$30/MWh level, the bid floor provides no incentive for some resources to bid decrementally and in fact, the appropriate floor should be high enough to cover the potential energy payments that will be offered to VERs in the future.

A number of stakeholders supported the strategy of lowering the bid floor to -$1,000/MWh (in stages) as outlined in the straw proposal; however there were others who suggested that this approach was too extreme and that the floor should only be lowered to a level that offsets the incentives provided to resources to generate. A summary of stakeholder comments is located in Appendix A of this paper.

DMM also recommended lowering the bid floor but not to the extent proposed. They felt that it was not clear that lowering the bid floor to -$1,000 would provide more incentive for resources to bid decrementally than a higher bid floor. The ISO agrees with this perspective. When the ISO examined the reasons for self scheduling we confirmed that lowering the bid floor may not provide any additional incentive for these resources to bid. Many self schedule because of environmental or contractual reasons and not based on price risk. This is one reason why the ISO changed its focus on the energy bid floor level so that we could provide incentives for resources, like VERs, that seem to be able to respond given the right circumstances. We also feel that it’s important to consider other types of resources, including demand and storage in the development of the energy bid floor. The right pricing incentives will enable these types of resources to earn revenues by consuming energy in real-time.

### 3.3 Bid Cost Recovery

Bid cost recovery (BCR) is the process by which the ISO ensures that scheduling coordinators are able to recover start up, minimum load costs and bid costs for generating units, system resources (resources located outside of the ISO balancing authority area) and participating loads. Currently, the BCR calculation is performed over the entire trade day and netted across all markets for that trade day.

During the ISO’s investigation and analysis of the energy bid floor proposal for Phase 1 of the Renewable Integration effort, it became clear that we needed to examine how lowering the bid floor could affect bid cost recovery. Revising the current netting methodology for bid cost recovery during this phase of the Renewable Integration initiative is important because it mitigates the risk of bidding in the real time market and lessens the incentive to self schedule. In the straw proposal we suggested that instead of netting costs and revenues from all markets over a trade day we could separate the netting by market.

In their written comments stakeholder’s agreed with the idea that it is appropriate to consider changes to bid cost recovery at this time. In fact, all stakeholders who commented agreed that separating the netting by market was a good idea. In this initiative we will be limiting the scope of BCR changes to the netting methodology. However stakeholders provided feedback on other potential change to BCR including BCR by commitment period, applying BCR to single bid intervals (hourly in both DA and RT), unbundling BCR into two separate buckets to identify energy bid recovery and commitment cost recovery.
Part of the rationale for limiting the scope of BCR changes at this time is the need to work toward a relatively near-term implementation of the changes recommended in the proposal. In addition, however, the limitation of scope is out of mindfulness that other stakeholder initiatives – such as two-tier uplift (which we are under FERC mandate to evaluate), multi-day unit commitment, and simultaneous RUC and IFM – will also require refinements to BCR. Rather than over-hauling BCR as part of this current initiative, the ISO recommends that we only evaluate the netting change which we view as important in facilitating the phase-out of PIRP and the lowering the energy bid floor.

DMM was also supportive of separate bid cost recovery calculations for day-ahead and real-time provided that the ISO analyze the potential impact that this separation would have on BCR uplifts.

The charts provided in the attachment to this Revised Straw Proposal show the current BCR costs with today’s netting and how aggregate BCR would have been different since the start of the LMP market in April 2009 under three different netting scenarios.

### 3.3.1 Interaction of the Energy Bid Floor with Bid Cost Recovery

The current methodology of netting revenues and shortfalls across both the day-ahead and real-time markets for a trading day, combined with a substantially lower bid floor, could create a disincentive for generators to submit incremental economic bids into the real-time market. The way that the current bid cost recovery is structured a resources’ revenues in one market (e.g. day ahead) are impacted by losses in other markets (e.g. real time). If an SC believes that lowering the bid floor will have a negative impact their revenues, it may increase their incentive to self schedule which is contrary to the intent of this renewable integration proposal. In order to protect revenues in one market when there are losses in another, the ISO and stakeholders suggested that separating the netting of revenues and costs by market will mitigate these concerns.

The straw proposal correctly identified that if the bid floor is lowered, prices will be able to move farther downward (more negative) which could result in more costs eligible for bid cost recovery. In addition, this could become a larger concern with higher penetration of renewable resources resulting in more variable supply and price volatility. The potential for more extreme negative prices in combination with the current bid cost recovery netting rules may cause a disincentive to offer incremental bids into the market.

The ISO’s proposal to mitigate this problem is to change the bid cost recovery rules so that netting occurs separately for the day-ahead and real-time markets. Research of ISO/RTO practices seems to conclude that PJM, NYISO, MISO and the NEISO net in this fashion (i.e., separately within each market).  

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3.3.2 Bid Cost Recovery Proposal

In the straw proposal the ISO discussed changing bid cost recovery so that netting is performed separately by market. After further consideration it could make sense to net the revenues and costs of RUC against either Day-Ahead or Real-Time revenues and costs for the purpose of determining BCR rather than netting them separately.

The choices are:

- Net the costs and revenues from RUC, IFM and RT individually.
- Net RUC and IFM costs and revenues together; net RT costs and revenues separately.
- Net RUC and RT costs and revenues together, net IFM costs and revenues separately.

Since the RUC is committed based on the load forecast to run in RT it may be clearer to net these costs together.

The ISO is looking for stakeholder input regarding the appropriate netting scheme. We are also performing internal reviews of all the current rules related to BCR and netting to understand how each option will impact the market in addition to considering future market enhancements such as multi-day unit commitment and simultaneous IFM and RUC. The internal analysis is also intended to assess the feasibility of implementation and scheduling of BCR changes.

Please see a brief analysis of historical BCR by market in Attachment B to this revised straw proposal.

4 Next Steps

The Renewables Integration market design initiative is being conducted in phases because, while substantial information on possible future system conditions has been presented so far, there remains significant additional analysis needed to clarify how aspects of market rules and procedures should be adapted and how they might relate to possible decisions about operational needs in the Resource Adequacy program and CPUC long-term procurement planning. This Phase I Revised Straw Proposal builds on the prior policy papers\(^\text{18}\) as well as the ISO’s study of system operations and markets under 20\% - 33\% RPS\(^\text{19}\) and does not repeat much of the information reviewed in those papers and studies. Readers are referred to those documents for additional background. In particular, note the definitions and measurement of load-following and regulation capacity requirements, both up and down, shown in those documents.

The ISO will submit comments to the Federal Energy Regulatory Commission (FERC) on the Notice of Proposed Rule-Making (NOPR) on March 2, 2011 and the ISO will discuss our interpretation of any needed measures to comply with those proposed rules beyond the compliance already achieved through the ISO’s market current structure. A brief overview of these comments will be presented at the Stakeholder meeting for this initiative on February 24, 2011.

\(^{18}\) III.F.2.1.4 which is appendix F of the tariff http://www.iso-ne.com/regulatory/tariff/sect_3/mr1_append-f.pdf

\(^{19}\) Policy papers are available at the following link: http://www.caiso.com/27be/27beb7931d800.html

California ISO, Integration of Renewable Resources: Operational Requirements and Generation Fleet Capability at 20% RPS (August 31, 2010), [henceforth 20% RPS Study], available at http://www.caiso.com/2804/2804d036401f0.pdf. The ISO held a stakeholder meeting to discuss the findings of the 20% RPS study on September 17, 2010; the presentation is available at http://www.caiso.com/2812/281211b8156550.pdf. The ISO also received comments on the study methodology.
The ISO will publish a scoping paper in the first quarter of 2011 to initiate Phase 2 of this stakeholder effort. The scoping paper will outline proposed scope and schedule, issues for discussion and questions to be answered in order to move towards a straw proposal for Phase 2 of the Renewable Integration stakeholder initiative.

The ISO will hold an on-site stakeholder meeting on February 24, 2011. The ISO seeks stakeholder written comments on this Revised Straw Proposal by March 3, 2010. Phase 2 of this initiative, as described above will commence in the first quarter of 2011. Please email all correspondence to RI-MPR@caiso.com. (Please note that this e-mail address has a dash in it.)
5 Appendix A – Summary of Stakeholder Comments on the Straw Proposal

- 6 Cities = Cities of Anaheim, Azusa, Banning, Colton, Pasadena, and Riverside California (Bonnie Blair)
  - Supports PIRP proposal
  - Supports lowering the energy bid floor, but to a much lesser extent than proposed. They feel a bid floor in the range of -$40 to -$50 per MWh is sufficient
- Bonneville Power Administration (Elliot Mainzer)
  - Supports PIRP proposal
  - Supports lowering the energy bid floor, but to a much lesser extent than proposed. They feel a bid floor in the range of -$75 per MWh is sufficient
- CESA = California Energy Storage Alliance (Don Liddell)
  - No specific comments on the proposal, but states that it seems “generally appropriate”
  - Provides some additional comments on Phase 2 and on CPUC RA proceedings. These are not directly relevant to the Phase 1 straw proposal
- CAISO DMM = Department of Market Monitoring (Jeff McDonald)
  - Supports a modest reduction in the bid floor (not -$1,000/MWh) determined through analysis
  - May be supportive of separate bid cost recovery calculations; additional analysis should be performed
  - The ISO should consider alterations to the current scheduling rules that may be contributing to the high level of self scheduling
  - Concerned about extended grandfathering for PIRP resources. Suggest that rules be modified to ensure that all PIRP capacity be price responsive and may be curtailed when negative prices occur
- CPUC = California Public Utilities Commission (Keith White)
  - Supports the PIRP proposal
    - Supports allocating forecast fee to entire market
    - They feel that RA VER should be categorized as non-dispatchable use-limited, not dispatchable
    - Supports grandfathering, and recommends additional grandfathering provisions for small VERs
  - Does not support initially lowering the bid floor to the extent proposed. Feels that a bid floor in the range of -$200 per MWh is sufficient
    - Does not find evidence for symmetric bid floor compelling
    - Supports applying separate BCR netting in DA and RT, as well as sufficient protections to mitigate potential market power (I assume they mean LMPM for negative bids), and protection (especially for VERs) from exposure to negative prices
  - Additional comments with respect to RA, LTPP
- Calpine Corporation (Mark Smith)
  - More investigation of self-scheduling motivations necessary
  - Not convinced that lowering the bid floor will translate into increased submission of economic bids
  - Recommends structural fixes to the markets first
  - Because they are unable to avoid fleeting negative prices, generators may self-schedule even more to protect themselves
- BCR should be calculated by netting only over each hour, and within one market at a time
- The proposed energy bid floor is too low and the transition to it is too fast

- CalWEA, LSA, VSI = California Wind Energy Association, Large-Scale solar Association, Vote Solar Initiative (Susan Schneider)
  - “Strongly oppose the elimination [of PIRP] and the lack of expansion [of the program] to DA or Dynamic Transfer schedules”
  - “Support instead reasonable changes to allow economic bids and further assessment of changes in light of CAISO needs and other regulatory/market developments”
  - Support the proposal position for the energy bid floor

- CEERT = Center for Energy Efficiency and Renewable Technologies (David Miller)
  - Encourages the ISO to try to incent other resources, especially hydro, to provide economic bids rather than targeting VERs – especially since s/s is so prevalent in our market

- Dynegy (Brian Theaker)
  - Supports freezing and even eliminating PIRP
  - Requests greater clarity on grandfathering PIRP resources
  - Supports lowering the bid floor – in theory – but…
    - Does not support lowering the bid floor without changes to BCR – remove netting across markets and change 24-hours to "commitment period"
  - Cautiously intrigued by the proposal to consider operational attributes in RA procurement

- LS Power (Sandeep Arora)
  - PIRP should not be discontinued as it promotes the development of renewables by reducing imbalance risk – ISO should develop a replacement for PIRP
  - Supports liberal grandfathering of PIRP resources, including those not yet commercially operable
  - PIRP should be extended to out-of-state VERs

- Independent Energy Producers Association (Brian Cragg)
  - Generally supports, and discusses nuances specific to QFs (CHP)

- PGE = Pacific Gas & Electric (Kurt Hansen, Ian Quirk)
  - Supports no administrative measures at this time to reduce self-schedules
  - Supports the phase-out of PIRP
  - Seeks some clarification on the treatment of EIRs as use-limited RA resources
  - “Bid floor proposal should be based on economic analysis and a more cautious reduction approach is warranted”
  - Concerned about the ability of resources to respond to negative prices, and about the possible settlement issue (BCR)
  - Not compelled by information from other ISOs and feels that the current proposal is arbitrary

- Powerex Corporation (Gifford Jung)
  - Supports PIRP proposal
  - Supports symmetrical energy bid floor
  - Regardless of changes to the energy bid floor, they strongly believe that we should change BCR. Specifically, separate DA BCR, and add an hourly BCR mechanism for incremental dispatches in the HASP/RT (similar to other ISO/RTOs).

- SMUD = Sacramento Municipal Utility District (Greg Schwartz)
  - “Market structure should still provide the practical ability for intermittent renewable resources to hedge against the potentially devastating combination of two factors
over which they have no control.” i.e., unexpected changes in output and extreme market clearing prices
  o Supports grandfathering as proposed – including extending it to facilities not yet commercially operable

- SDGE = San Diego Gas & Electric (Steve Keehn, Randy Nicholson)
  o Agrees that changes in the bid floor should provide the necessary incentives to minimize the use of s/s
    ▪ Recent proposal to increase RMT is in conflict with RI-MPR proposal
  o Supports the symmetrical energy bid floor
  o Supports the PIRP proposal
  o Notes that, “until curtailment rights become a standard in renewable contracts going forward, the operational flexibility which the CAISO hopes to encourage with the proposed bid floor and PIRP changes could fail to materialize.”

- SCE = Southern California Edison (Jeffrey Nelson)
  o Supports the proposal to transition away from PIRP
  o Requests more clarity on grandfathering and provides suggestions in this respect
  o Supports a lower bid floor, but does not support going to -$1,000
  o Feels that focus of attention should be resolving structural issues, and not simply lowering the bid floor

- WPTF = Western Power Trading Forum (Ellen Wolfe)
  o Not expressing a strong opinion on the phase-out of PIRP at this time. However…
    ▪ Seeks additional information on grandfathering scheme
    ▪ Requests more information on expected impacts of the proposed GMC policy including the expected rate impacts on non-PIRP participants
    ▪ Would like clarity on whether or not we will still procure the same types of wind forecasts as we currently do
    ▪ Will wind forecast data be made available to all market participants and, if so, at what level of granularity?
  o Supports the lower bid floor in theory, and supports proposal to limit BCR to the energy products.
  o Strongly encourages the ISO to revise BCR.
6 Appendix B – Historical BCR under alternative netting schemes

To get a sense of what kind of impact changing the netting protocol for BCR would have, the ISO looked at two counterfactuals by quarter for the period from April 2009 – the start of the LMP market – through December 2010. In the charts below, the green bars capture the total BCR actually paid where the stacked blue and red bars show total BCR under the different netting scenarios.

In the case that BCR is calculated by netting RUC and RT together separately from IFM, there is a 10% increase in total uplift.

Comparison of Netting across Markets with Netting RT and RUC Separately from IFM

Q2 2009 through Q4 2010
In the case that BCR is calculated by netting IFM and RUC together separately from RT, there is a 13% increase in total uplift.

Comparison of Netting across Markets with Netting IFM and RUC Separately from RT
Q2 2009 through Q4 2010
In the case that BCR is separate for IFM, RUC and RT, there virtually no difference from the previous scenario. This is intuitive since the RUC “bucket” is generally small.

Comparison of Netting across Markets with Netting RT, RUC and IFM Separately
Q2 2009 through Q4 2010